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**STADY COMBINED PANELS TO PROTECT INFORMAYION FROM
LEAKING VIA ELECTROMAGNETIC AND ACOUSTIC CHANNELS**

**1-98 80 01 «Methods and systems of information protection, information
security»**

**Thesis synopsis
for the degree of master of science**

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INTRODUCTION

Now the problem of maintenance of protection of the information from leakage on acoustical and electromagnetic channels of information leakage is rather actual. For its solution active both passive methods and resorts are used. Resorts of blocking of the acoustical and electromagnetic channels existing today, carried out in the form of screening and sound-insulating materials have essential deficiencies, such as high cost, that essentially influences wide use of similar materials and causes application of inexpensive active protection frames of the information, and complexity of installation of such materials at shielding and sound insulation of premises complicates their process of application.

The solution of the given problem can be provided at the expense of formation of constructions of panel of electromagnetic and acoustical protection created on the basis of inexpensive in relation to existing materials and allowing simultaneously to block acoustical and electromagnetic channels.

The purpose of the given dissertational operation was working out of a testing technique of soundproofing devices of building constructions. Are resulted the description of installation for measuring, sequence of acts at studying of a certain material or a construction. Separate materials (gypsum cardboard, coat Crumb) are studied and their various combinations in a lamination, agency of expedients of the joint and attaching on the basic performances of sound insulation of aerial noise is explored. Recommendations about application of soundproofing devices of building constructions are given.

GENERAL DESCRIPTION OF THE WORK

Communication of operation with large scientific programs (designs) and themes

The theme of dissertational operation is confirmed by the order of the rector of establishment of formation «the Belarus state university of information science and radio electronics» № 385 from 30.12.2010 and matches to subsection 5.5 "Methods, resorts and production engineering of maintenance of the informational safety at machining, storage and a data transfer with cryptography use» the priority directions of fundamental and applied scientific examinations of Byelorussia for 2011-2015, confirmed by the Decision of Ministerial council of Byelorussia on April, 19th, 2010, № 585. Operation was carried out in formation establishment «the Belarus state university of information science and radio electronics».

The purpose and research problems

The purpose of dissertational operation consists in working out of constructions of panel for protection of the information against leakage on acoustical and electromagnetic channels.

For object in view achievement it was necessary to carry out following problems:

1. To analyse up-to-date protection frames of the information.
2. To develop and explore constructions of panel for protection of the information against leakage on acoustical and electromagnetic channels.

The personal contribution of the competitor

All basic effects, leading-outs are gained by the competitor self-maintainedly. It develops constructions of panel for protection of the information against leakage on the acoustical and electromagnetic channel.

Approbation of effects of the dissertation

Substantive provisions and effects of the dissertation were discussed at XII Belarus-Russian scientific and technical conference "Hardware components of protection of the information" (Minsk, 2014).

Publications on a dissertation theme

By results of the examinations presented to the dissertations, 1 operations, including 1 papers in collectors of materials of conferences are published.

CONCLUSION

The acoustic channel is one of the most likely channels of information leakage. Voice information in the enclosing building elements is distributed in the form of mechanical vibrations. There are two modes of vibration: longitudinal and transverse. Their distribution is due to effects: interference, reflection, refraction, diffraction, attenuation.

Existing insulating structures have significant drawbacks such as high cost, complexity of manufacture and assembly. To increase the sound insulation of airborne noise, layered structures, interleaving and securing the layers affect the insulating properties of them, including at their resonant frequency. In line with this, it seems urgent to develop test procedures for such structures, which allows to evaluate not only the attenuation of airborne sound, but also the resonant frequency of an element of the building structure.

The method of testing sound insulation of construction elements. This method consists of two parts: measuring acoustic structure and the measurement of the resonant frequency of the structure. The resonant frequency, along with soundproofing, is an integral parameter. At their resonant frequency of the sound attenuation structure is minimal; taking into account the frequency spectrum of the speech, the coincidence of high frequency leakage of information. The resonant frequency depends on the geometrical design and physical design parameters.

Sound insulation panels must be characterized by the following properties: high sound-insulating ability, ease of assembly and installation, economic feasibility. The decision on creation and testing layered soundproof panels on the basis of building materials to the construction fasteners. As a basis were chosen two materials: dry wall and covering Crumb. Conducted studies of these materials, and combinations thereof, also studied the effect of compounds on the characteristics of the construction layers. In the analysis of the results obtained following conclusions:

1. It is shown that the reduction of air noise dry wall -5dB than coating Crumb;

2. The relative positions of the materials does not affect their resonant frequency of the sound insulation and, consequently, construction plasterboard coated completely equivalent Crumb coating structure with plasterboard;

3. The resonant frequency above the resonance frequency dry wall Crumb coating and is equal to the resonant frequency of the combined structure of the coated gypsum board Crumb, which is 1600Hz;

4. The compound plastic ties led to a reduction of air noise attenuation structure by 2,4dB due to the appearance of holes;

5. Compound plastic ties three materials has not led to a significant increase in the frequency acoustic 31,5-8000 Hz and has led to a significant reduction in acoustic range 8000-16000 Hz as compared with the construction dry wall without Crumb coated plastic ties;

6. Compound plastic ties greatly affects the resonant frequency. For example, the resonant frequency of the dry wall construction coated Crumb is 1600 Hz, while there sonant frequency of the dry wall construction coated Crumb (ATP) is 3400 Hz.

For electromagnetic acoustic information protection recommended construction of plasterboard, foil and foam Penoplex. It is characterized by a transfer coefficient $-17...-44$ dB in the frequency range 0,7...18 GHz, and attenuation of the sound wave 4...27 dB in the frequency range 31,5...16000 Hz, that allows to recommend it for use as a sound-insulating and shielding materials to creates paces that provide both acoustic and electromagnetic blocking channels of information leakage.

LIST OF PUBLICATIONS

1. Бойправ, О.В.. Ослабление мощности электромагнитного излучения конструкциями экранов с геометрически неоднородной поверхностью на основе композиционных материалов / О.В. Бойправ, Т.В. Борботько, М.А.Х. Мусави // Материалы международного научно-технического семинара "Телекоммуникации: сети и технологии, алгебраическое кодирование и безопасность данных" : Тезисы докладов, апрель-декабрь 2014 г. / БГУИР ; редкол.: М.П. Батура [и др.]. – Минск, 2014. – С. 73-76.

Библиотека БГУИР